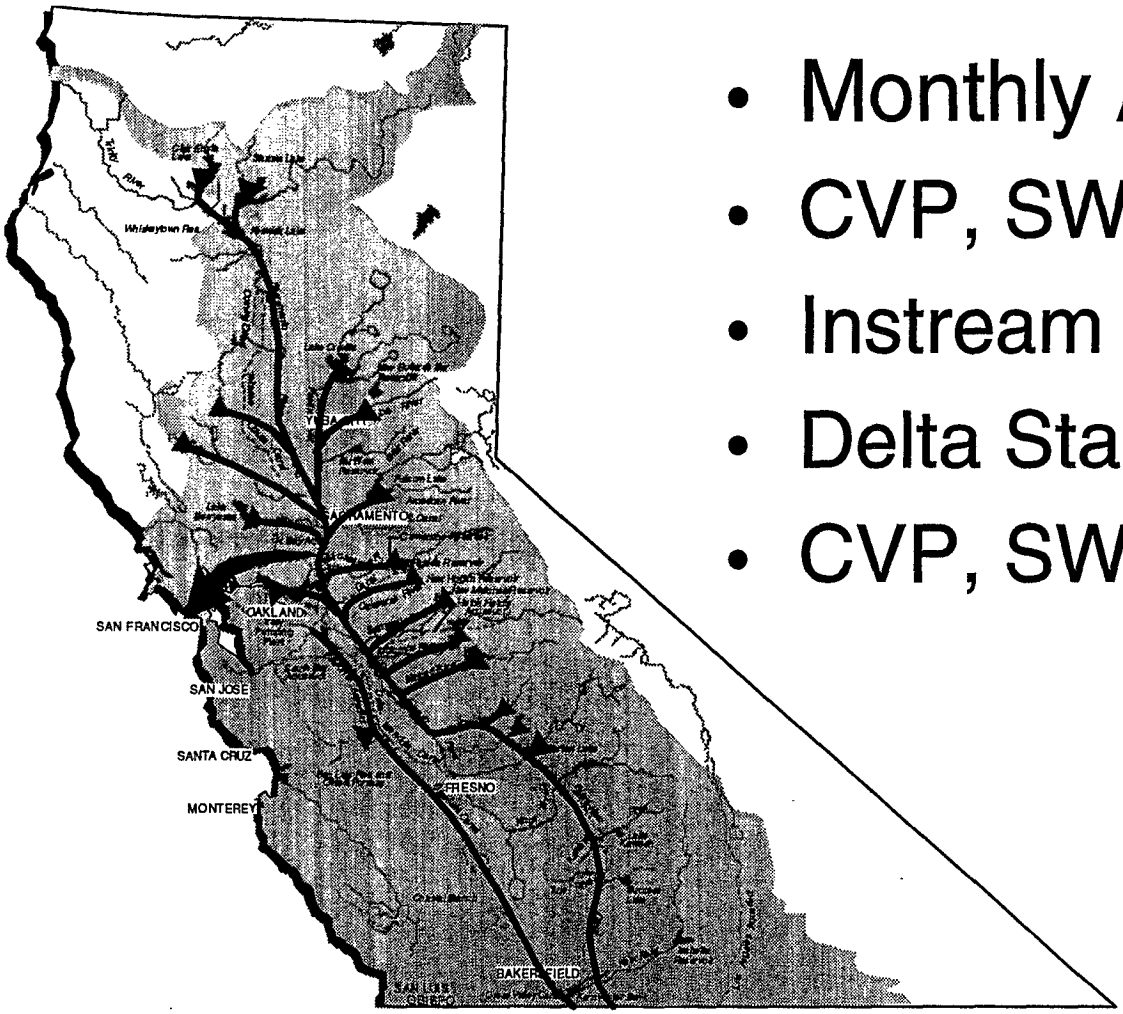
CALFED Bay-Delta Program
Water Supply Opportunities

Initial Evaluation of Alternatives

DWRSIM System Modeling



- Monthly Accounting Model
- CVP, SWP Operations
- Instream Flows
- Delta Standards
- CVP, SWP Deliveries

Existing Condition Assumptions

- 1995-Level Hydrology
- 2.6-3.5 MAF/Year Variable SWP Demand
- 3.5 MAF/Year W/ Level II Refuge CVP Demand
- Delta Standards - May 1995 WQCP
- Instream Requirements
  - Sacramento & American - April 26, 1996 CVPIA Flow Criteria
  - Yuba, Mokelumne & Tuolumne - New FERC Agreements
  - Feather, Stanislaus, Merced - Existing Requirements
- Trinity River Diversion 340 TAF/Year

No Action Assumptions

- 2020-Level Hydrology
- 3.3-4.2 MAF/Year Variable SWP Demand
- 0-138 TAF/Month Variable SWP Interruptible Demands
- 3.5 MAF/Year w/Level IV Refuge CVP Demand
- Instream Requirements
  - Sacramento & American - April 26, 1996 CVPIA Flow Criteria
  - Stanislaus - CVPIA Draft PEIS Flow Criteria
  - Yuba, Mokelumne & Tuolumne - New FERC Agreements
  - Feather, Merced, San Joaquin - Existing Requirements

No Action Assumptions

- Delta Standards
  - May 1995 WQCP
  - CVPIA (b)(2) Water Management
    - Additional Upstream Actions
    - 1:3 to 1:5 April-May Export Restriction
    - Additional Chipps Island X2 Days at 1962 Level of Development for May & June
    - Delta Cross Channel Closed from Sept. thru. June
- Trinity River Diversion 340 TAF/Year

Water Supply Opportunities Under Existing Conditions and No Action

Average Annual System Deliveries

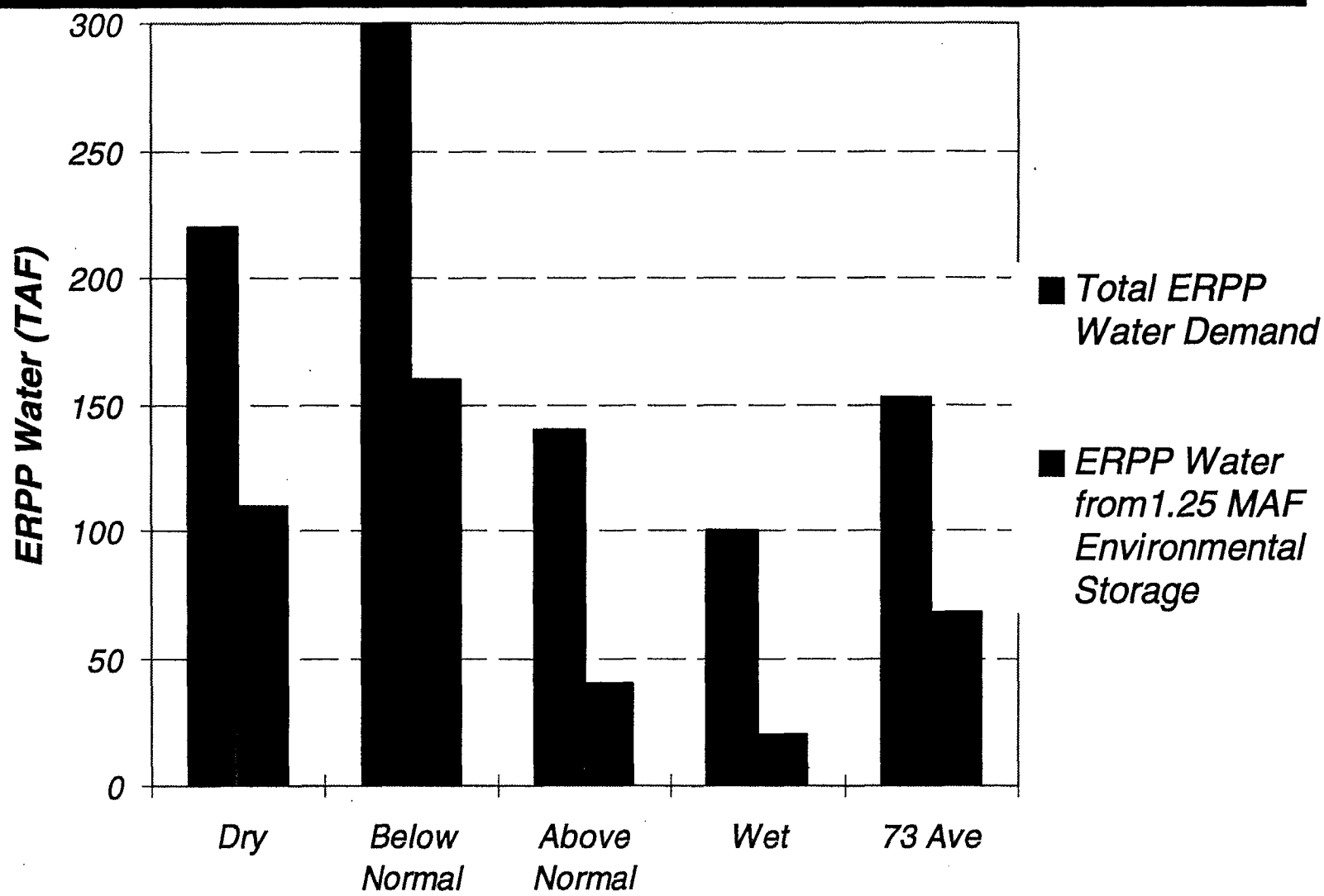
(in 1,000 acre-feet per year)

	Critical Dry Period	Long-Term
Existing Conditions	4,200	5,600
No Action	4,050	5,900

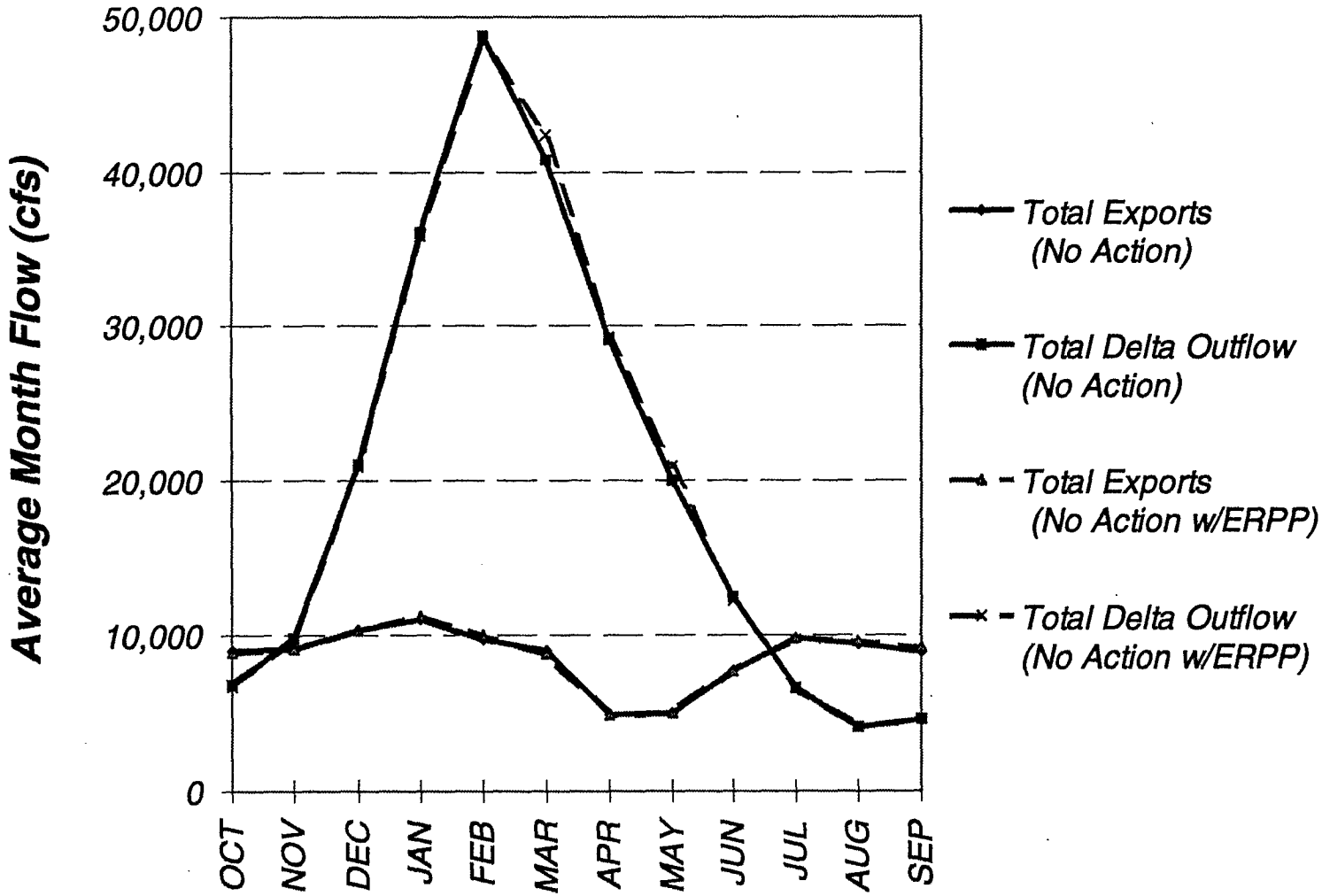
ERPP

- Environmental Flow Targets - ERPP
  - Flow Targets
    - March & April/May 10 Day Upstream Flow Event Targets
    - March & April/May 10 Day Delta Outflow Flow Event Target
    - 13,000 cfs May Freeport Flow Target
  - Operating Priorities
    - First Priority - New Environmental Storage
    - Second Priority - Water Acquisition from Willing Sellers (Modeled as "Add Water")

Total ERPP Demand Averages along with ERPP Flows from Environmental Storage



Average Monthly Delta Outflow and Exports with ERPP Flow Targets



Potential Action to Improve Water Supply Opportunities

Action	Net Incremental Increase in Average Annual Water Supply (in taf/year)	
	Critical Dry Period	Long-Term
	Low - High	Low - High
Improved Coordination of SWP-CVP Operations	0 - 10	0 - 50
Increase in Permitted Banks PP Capacity	100 - 150	150 - 250
Isolated Facility	0 - 200	0 - 300
Storage -- 4.75 MAF (Includes Increased Permitted Banks PP Capacity)	550 - 800	550 - 700

Improved SWP-CVP Coordination

- Joint Points of Diversion
- Increased Wheeling of CVP Water through SWP Facilities

Increase Permitted Banks Pumping Plant Capacity

- South Delta Improvements
  - Channel Enlargements
  - Barriers
  - Fish Screens
- Banks Pumping Plant Permitted Capacity Increased to 10,300 cfs

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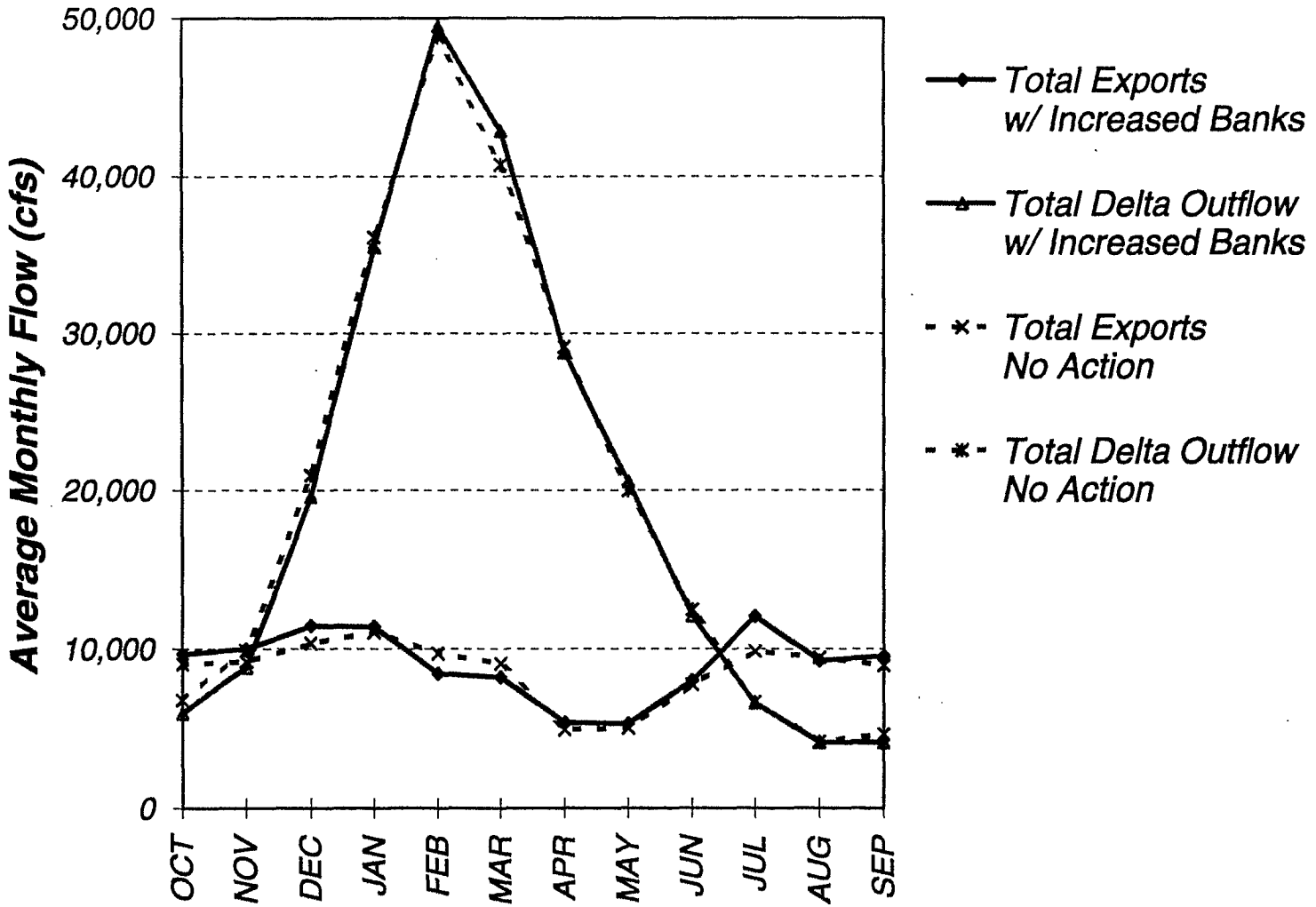
Average Monthly Delta Outflow and Exports with Increased Permitted Banks Pumping Plant Capacity

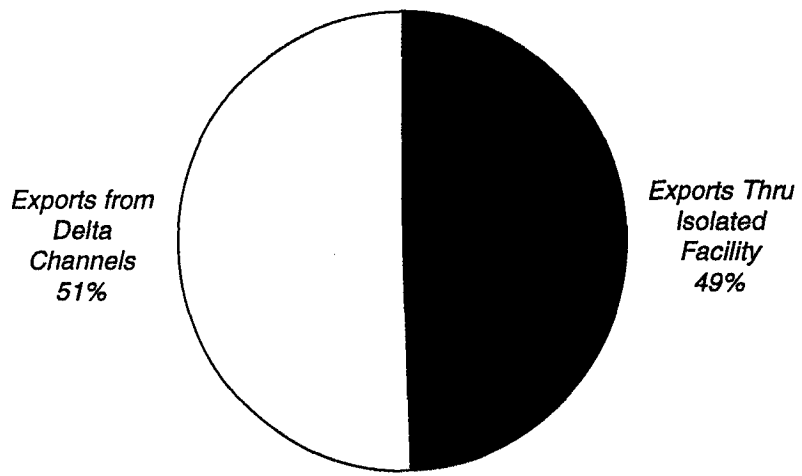


Isolated Conveyance Facility

- Initial Delta Standards with Isolated Facility
  - Minimum South Delta Export
    - 1,000 cfs July thru. March
  - Sensitivity Analysis on Export - Inflow Ratio Standard
    - Include IF Flows in E-I Ratio
    - Exclude IF Flows from E-I Ratio
  - Delta Cross Channel Gates closed Sept. thru. June
- Capacity 5,000 to 15,000 cfs
- Two Project Operation Modes
  - Dual Conveyance
  - Fully Isolated Conveyance

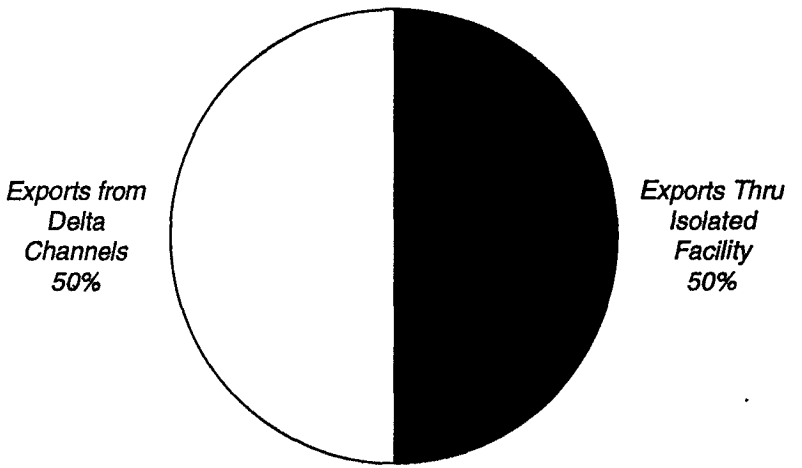
Isolated Facility System Operations

5,000 cfs Isolated Facility with E-I Ratio



- 1922-94 Average Annual Results
  - Min. Required Outflow = 5,640 taf
  - Flow at Rio Vista = 11,670 taf
  - Total System Deliveries = 6,130 taf
  - Nov-June X2 Position = 71.9 km

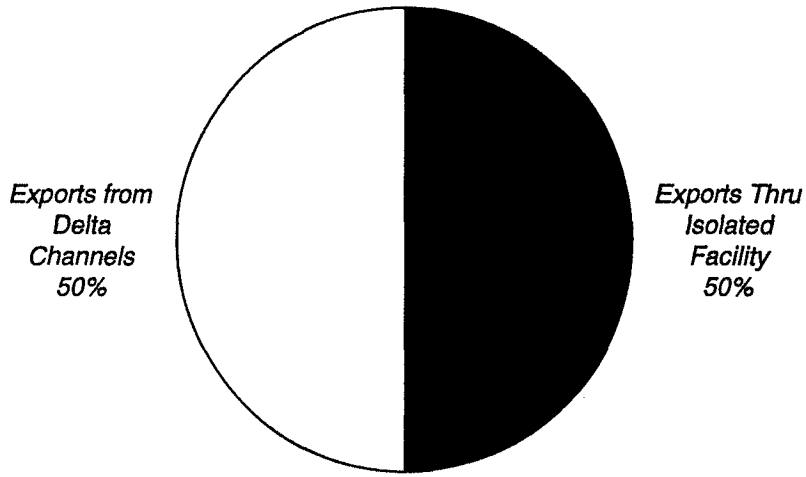
5,000 cfs Isolated Facility without E-I Ratio



- 1922-94 Average Annual Results
  - Min. Required Outflow = 5,620 taf
  - Flow at Rio Vista = 11,700 taf
  - Total System Deliveries = 6,260 taf
  - Nov-June X2 Position = 72.3 km

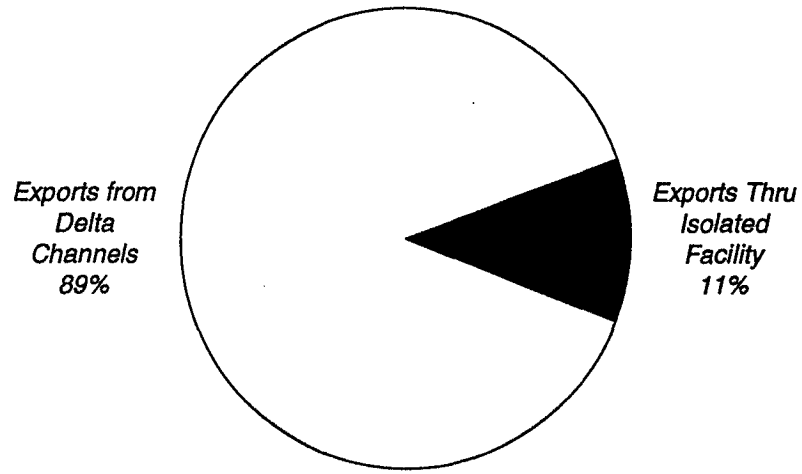
Isolated Facility System Operations

5,000 cfs Isolated Facility



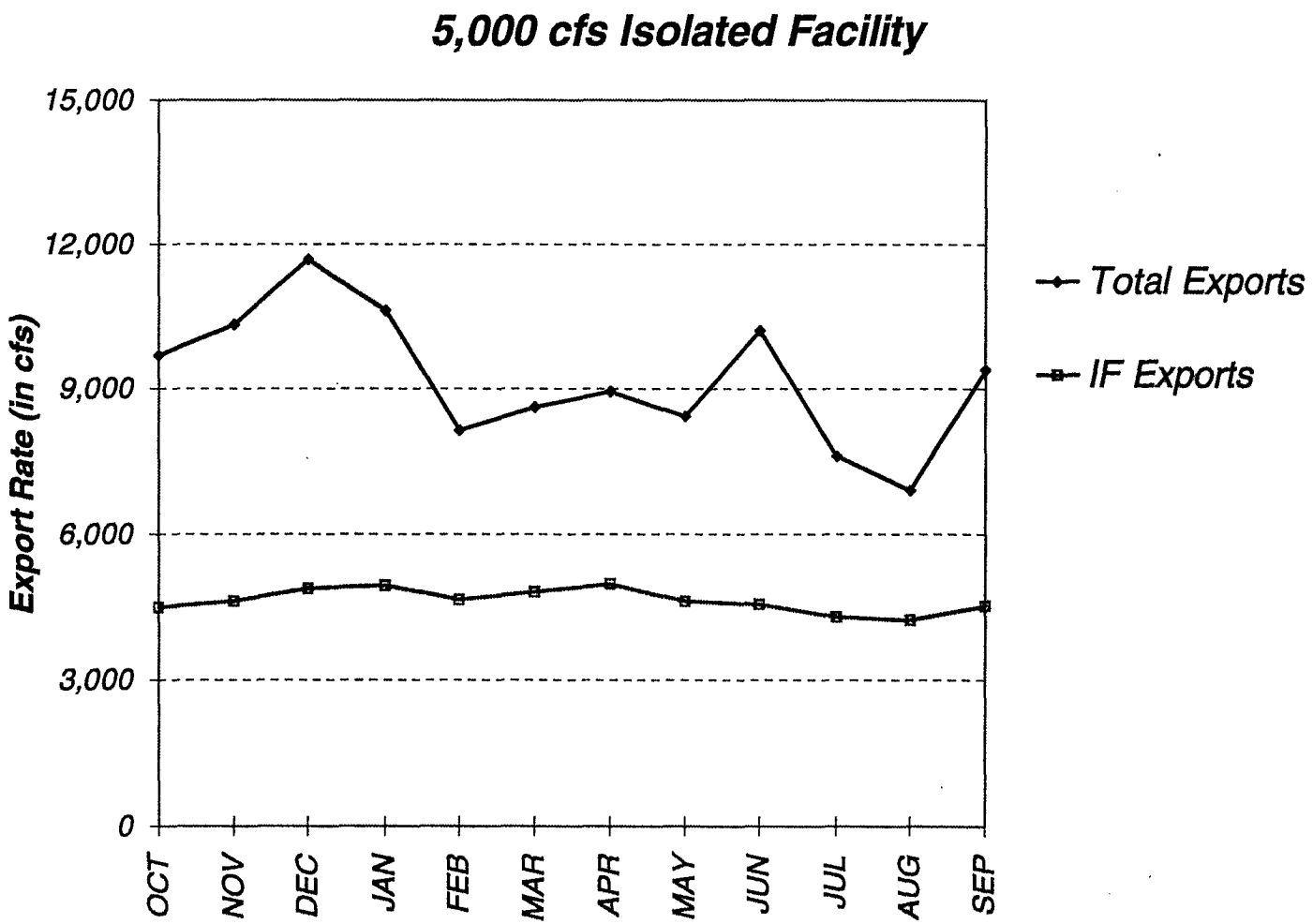
- 1922-94 Average Annual Results
  - Min. Required Outflow = 5,620 taf
  - Flow at Rio Vista = 11,700 taf
  - Total System Deliveries = 6,260 taf
  - Nov-June X2 Position = 72.3 km

15,000 cfs Isolated Facility

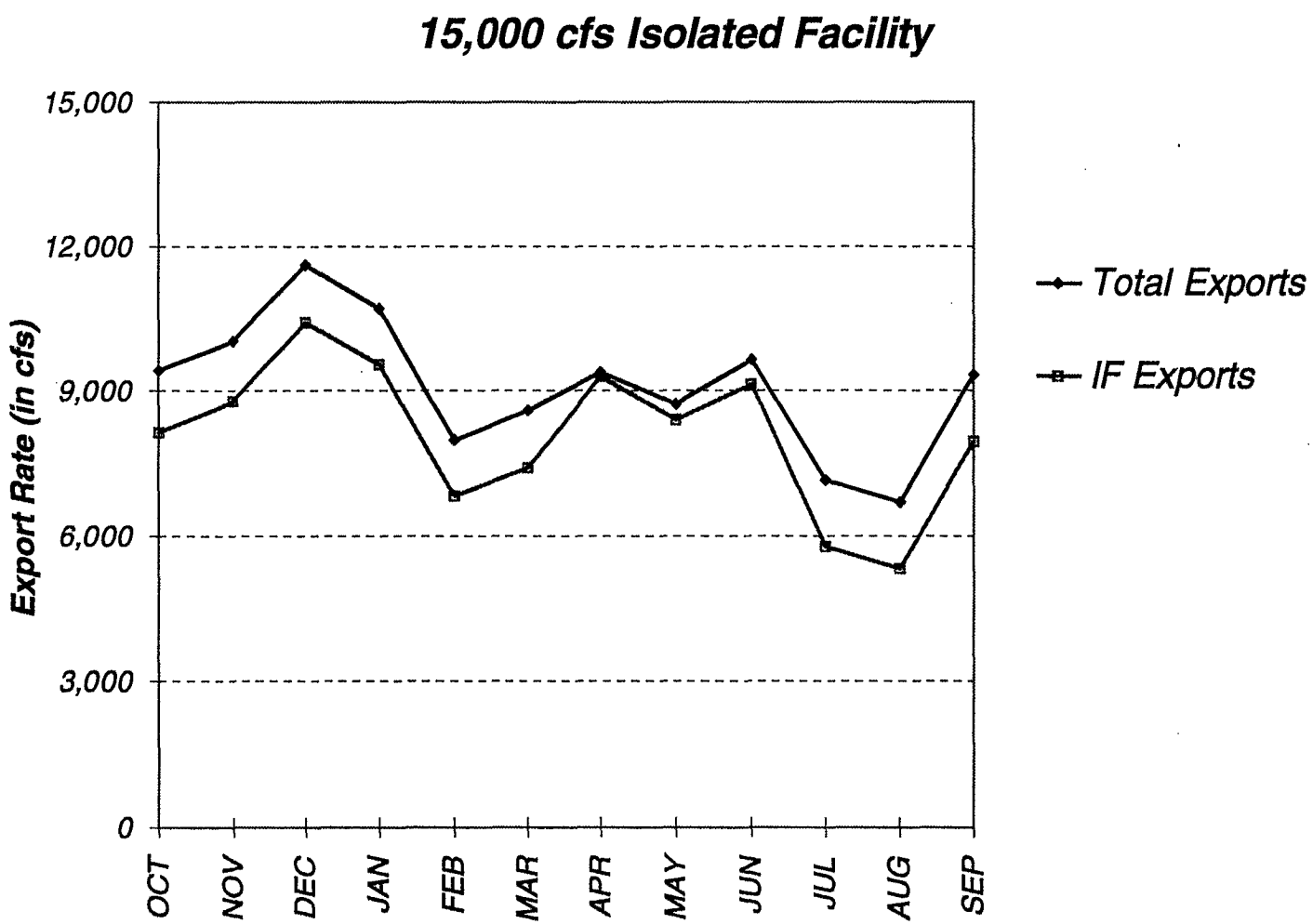


- 1922-94 Average Annual Results
  - Min. Required Outflow = 5,930 taf
  - Flow at Rio Vista = 9,570 taf
  - Total System Deliveries = 6,180 taf
  - Nov-June X2 Position = 71.9 km

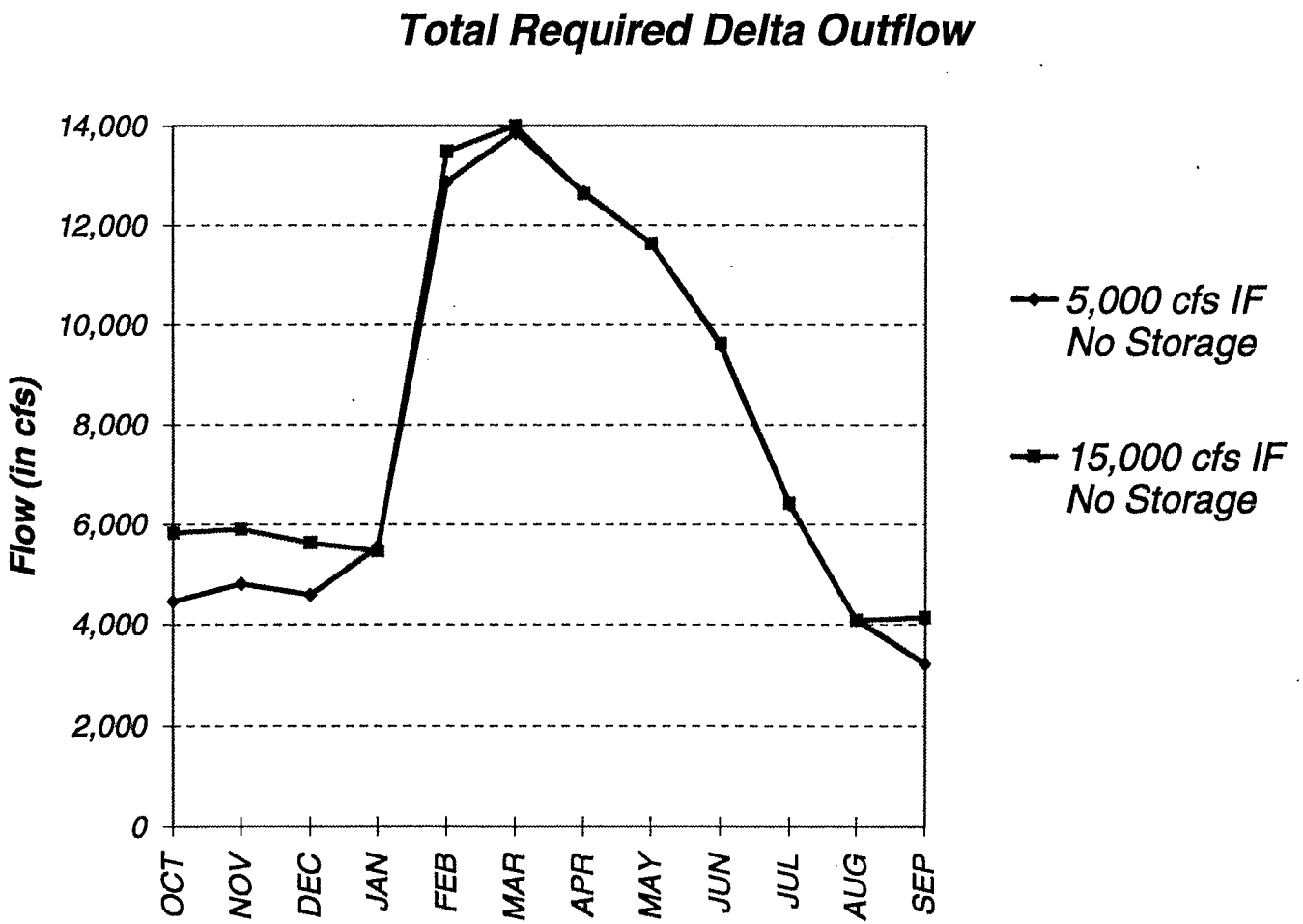
Isolated Facility System Operations



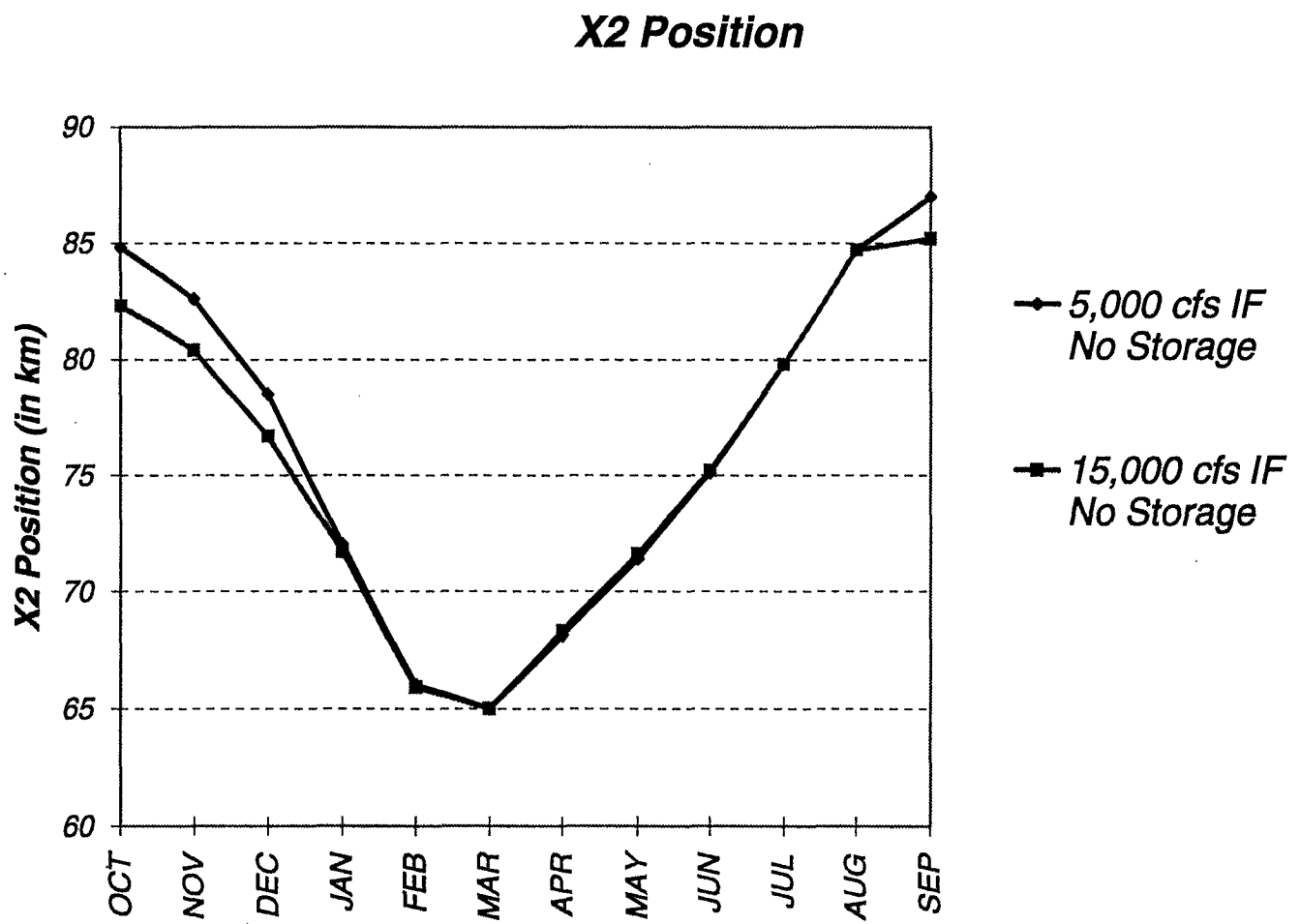
Isolated Facility System Operations



Isolated Facility Operations
5,000 vs. 15,000 cfs Capacity



Isolated Facility Operations
5,000 vs. 15,000 cfs Capacity



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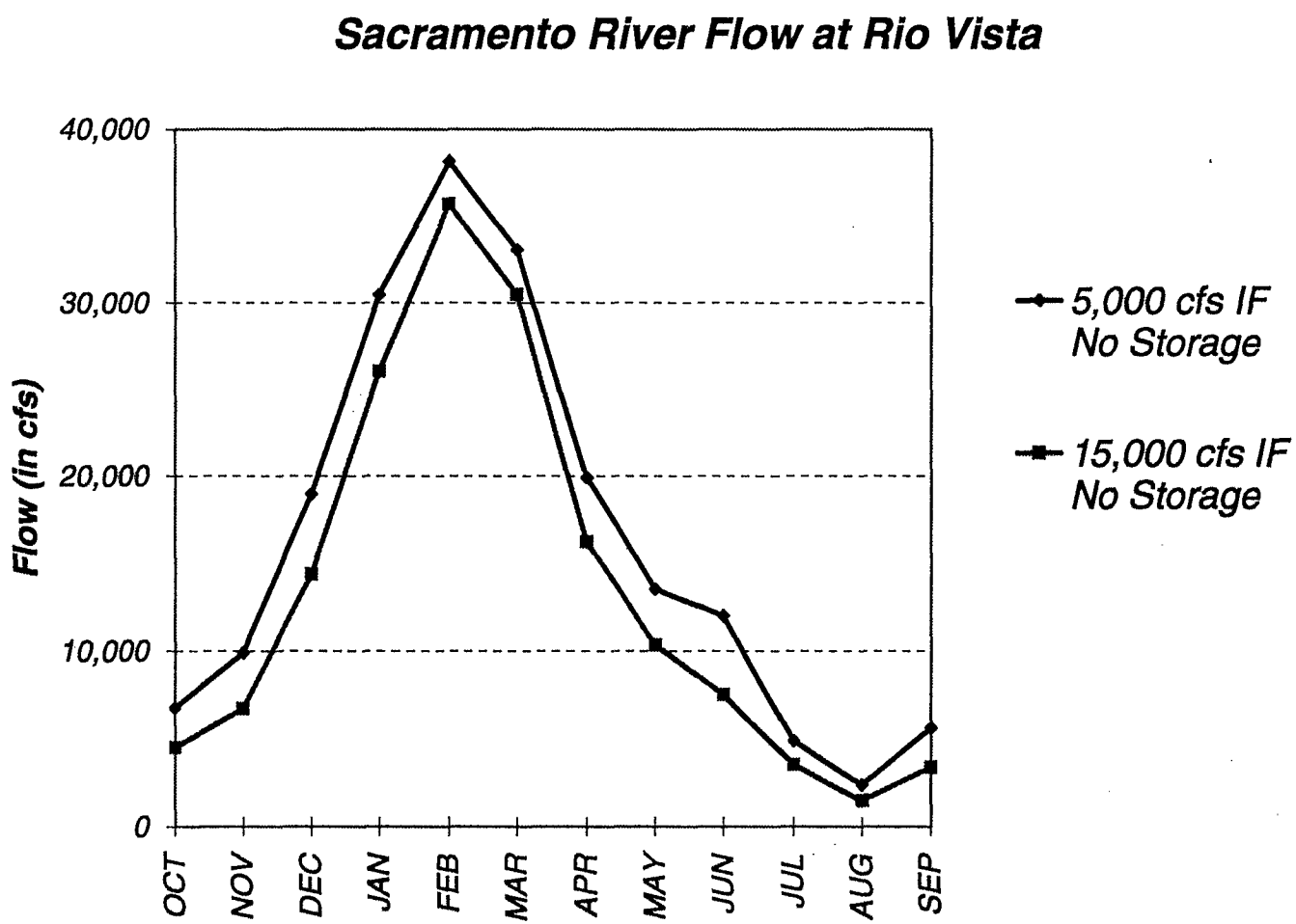
Isolated Facility Operations
5,000 vs. 15,000 cfs Capacity



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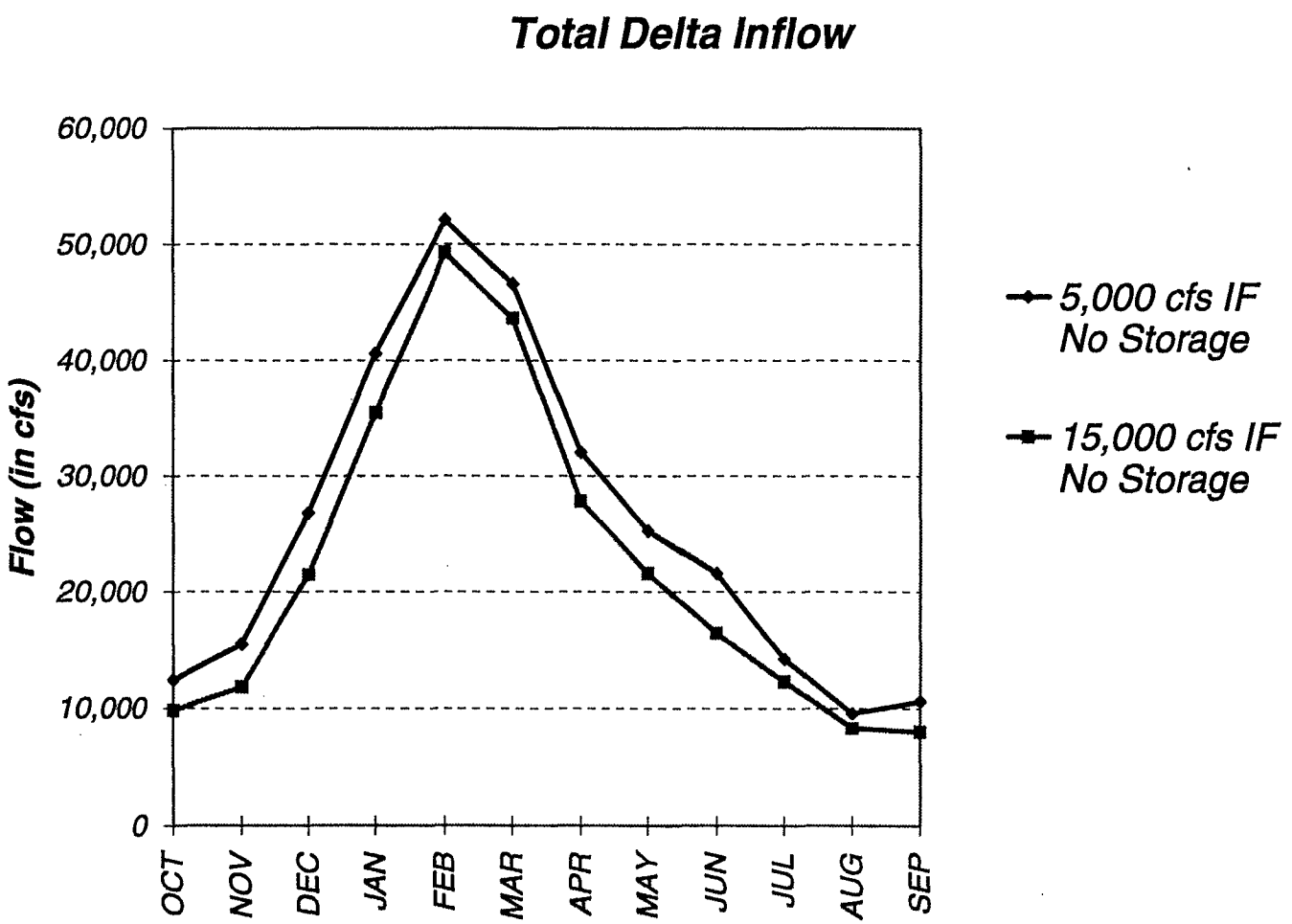
Isolated Facility Operations
5,000 vs. 15,000 cfs Capacity



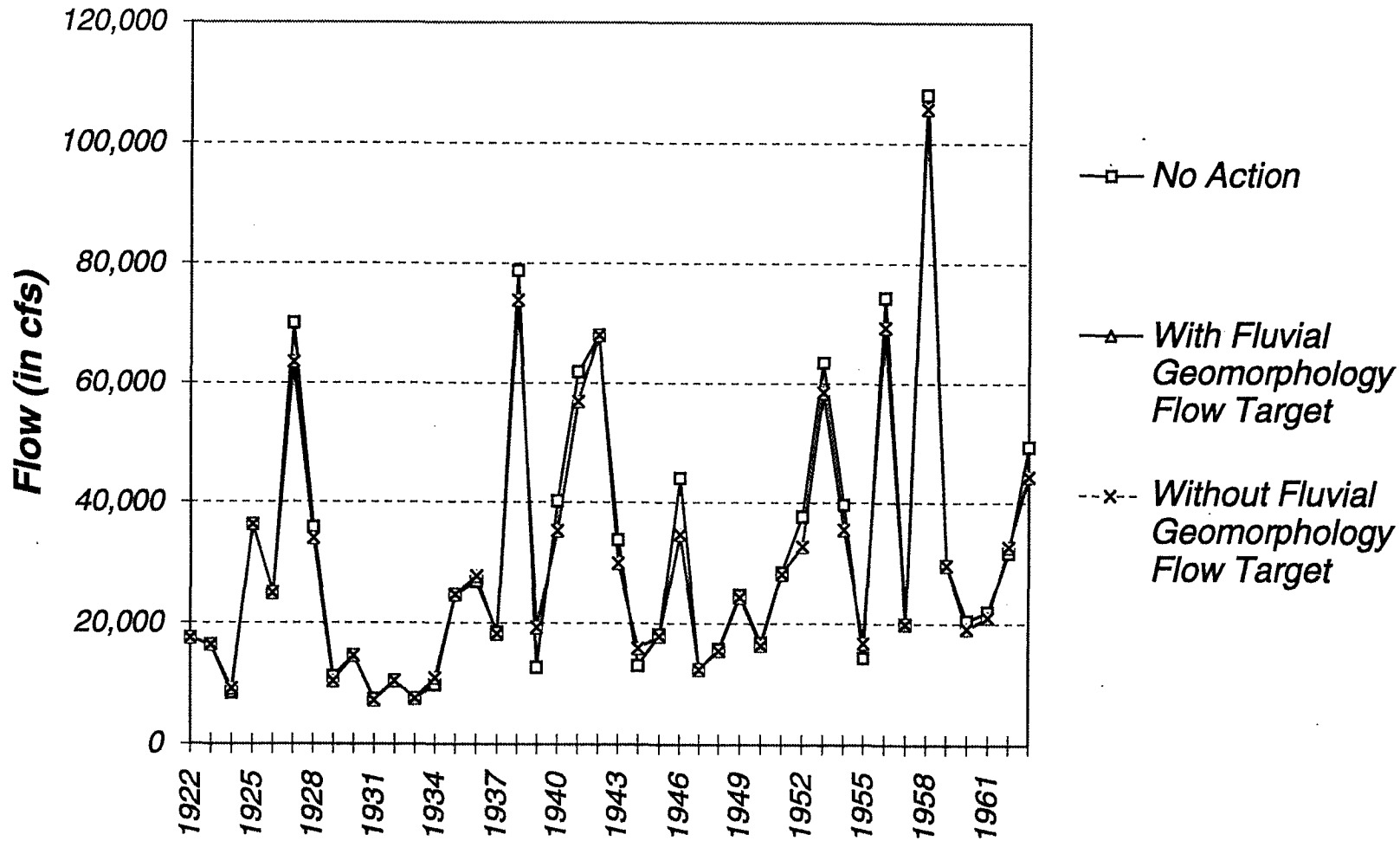
Storage

- New Storage Fill & Discharge Criteria
  - Tributary Groundwater - Fill First & Discharge Last
  - Aqueduct Groundwater - Fill Second & Discharge Fourth
  - Aqueduct Surface Storage - Fill Third & Discharge Third
  - Tributary Surface Storage - Fill Fourth & Discharge Second
  - Delta Surface Storage - Fill Last & Discharge First

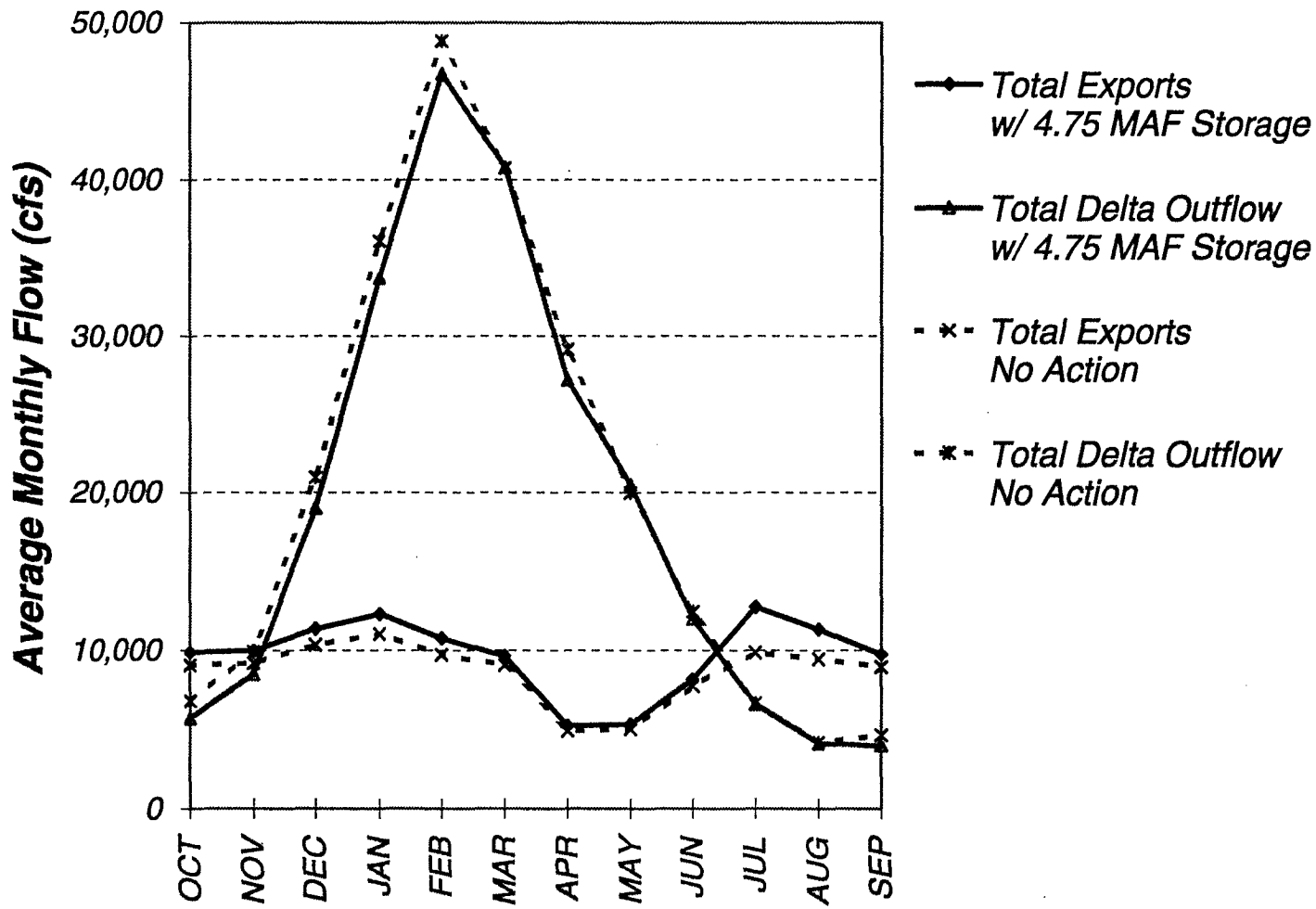
Storage

- New Storage Physical Facility Criteria
  - North and South of Delta Groundwater - Storage 250 (NDGS) & 500 (SDGS) TAF & Inlet/Outlet Capacity 500 cfs
  - Sacramento River Basin Surface - Storage 3.0 MAF & Inlet/Outlet Capacity 5,000 cfs
  - Off-Aqueduct Surface - Storage 2.0 MAF & Inlet/Outlet Capacity 3,500 cfs
  - San Joaquin River Basin Surface - Storage 250 TAF & Inlet/Outlet Capacity 5,000 cfs
  - Delta Surface Storage - Storage 200 TAF & Inlet/Outlet Capacity 5,000 cfs
- Fluvial Geomorphology Criteria
  - North Delta Surface - 60,000 CFS above Chico Landing / 0 cfs Below Chico Landing
  - Other Storage - No Criteria

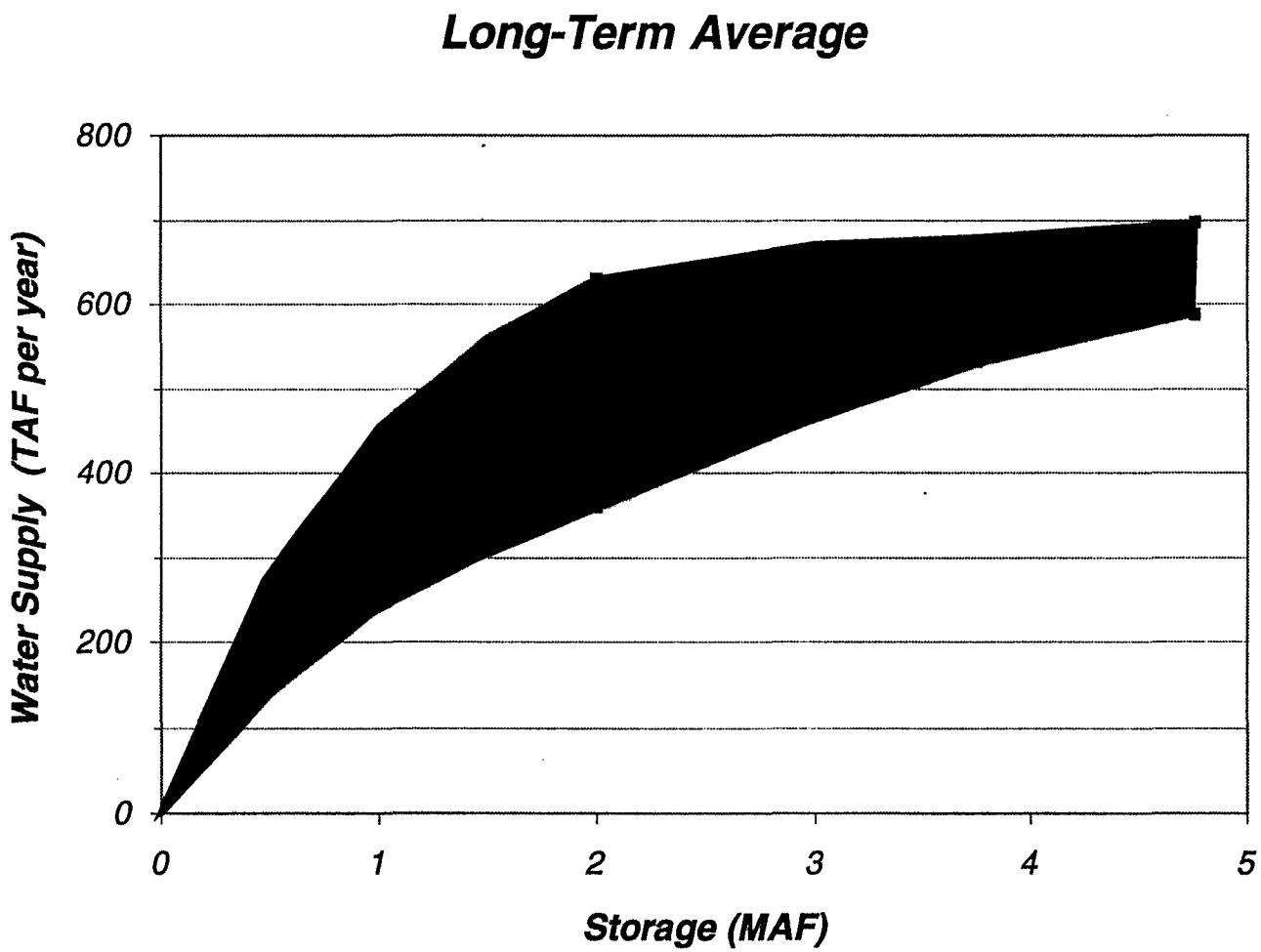
Maximum Annual Monthly Flow at Wilkins Slough



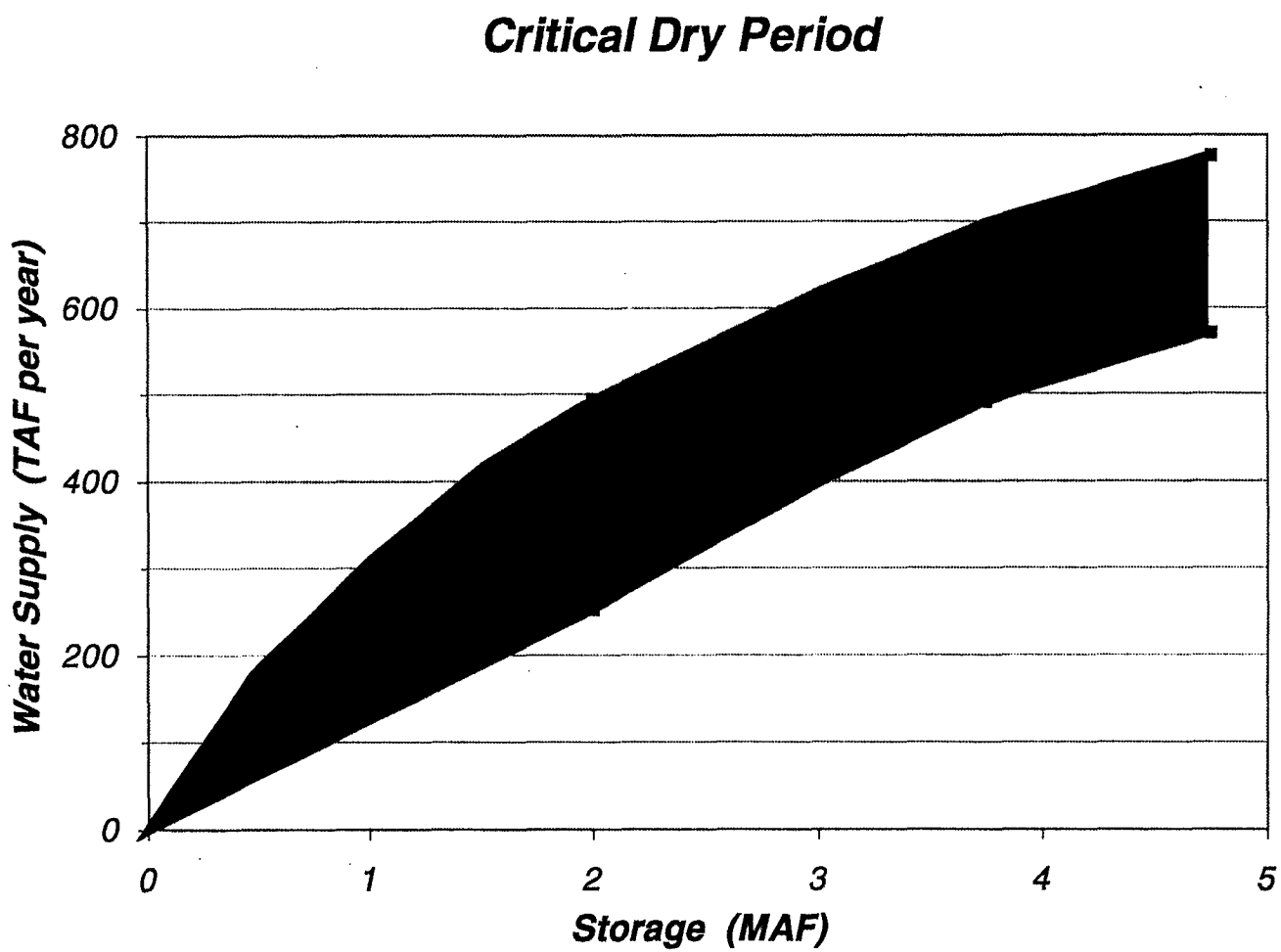
Average Monthly Delta Outflow and Exports with 4.75 MAF Storage



Water Supply versus Storage



Water Supply versus Storage



Water Supply Opportunities Under Program Alternatives Compared to No Action

Alternative	Net Increase in Average Annual Water Supply (in taf/year)	
	Critical Dry Period	Long-Term
	Low - High	Low - High
Alternative 1		
Improved Coordination of SWP-CVP Operations	0 - 10	0 - 50
With Increase in Permitted Banks PP Capacity	100 - 150	150 - 300
With Storage	550 - 800	550 - 750
Alternative 2		
Improved Coordination of SWP-CVP Operations	0 - 10	0 - 50
With Increase in Permitted Banks PP Capacity	100 - 150	150 - 300
With Storage	550 - 800	550 - 750
Alternative 3		
Improved Coordination of SWP-CVP Operations	0 - 10	0 - 50
Isolated Facility	0 - 200	0 - 350
With Storage	450 - 850	400 - 850

Summary

- Increasing permitted Banks Pumping Plant capacity could provide improved water supply, if water users can accept unscheduled deliveries.
- An Isolated Conveyance Facility can provide similar improvements in water supply, if diversions are excluded from existing E-I ratios. However, without moderate south Delta diversions, storage releases to met Rio Vista flow requirement reduce potential water supply benefits.

Summary

- Water supply benefits of storage are dependent on diversion and release criteria.
- There is no obvious break point in the benefits versus storage volume relationship.
- Increased system storage allows improvements in scheduled project deliveries, leaving water users less dependent on local storage.

Summary

- Water supply opportunities are dependent on operating requirements. Adjustments in Bay-Delta standards could have significant impacts on the potential water supply benefits of new facilities.